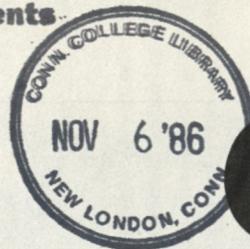


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Citizens' Bulletin

Volume 14 Number 2 October 1986 \$5/yr.
The Connecticut Department of Environmental Protection



Connecticut's Forests



Page 3.



Page 15.

Cover by Michael D. Klein

Citizens' Bulletin

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DEP Citizens' Bulletin

Published 11 times a year by the Department of Environmental Protection. Yearly subscription, \$5.00; two years, \$9.00. Second class postage paid at Hartford, Connecticut. Please forward any address change immediately. Material may be reprinted without permission provided credit is given, unless otherwise noted. Address communications to Ed, DEP Citizens' Bulletin, Dept. of Environmental Protection, Rm. 112, State Office Bldg., Hartford, CT 06106.

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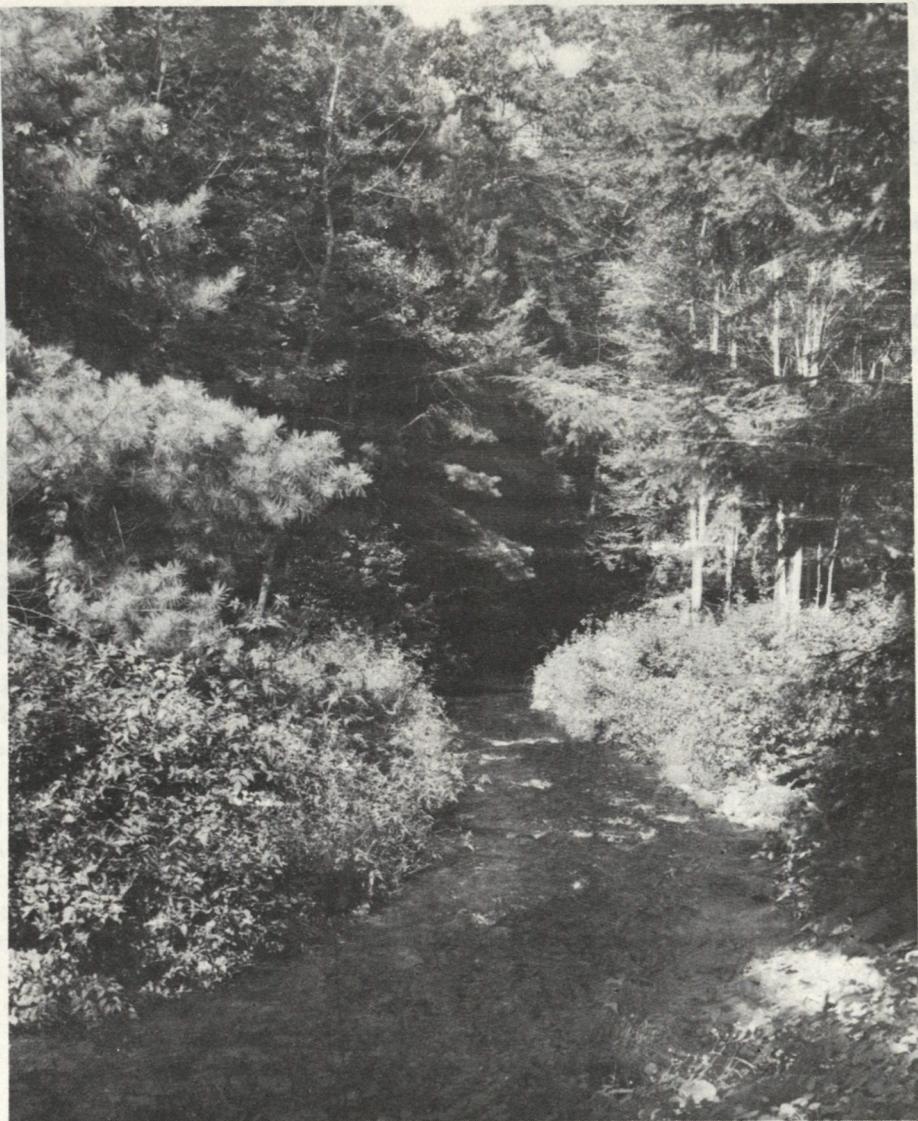
Editor's Note

Somebody once said that Formula-I racing drivers are pretty much the same as other people, except that they don't seem to blink as often. Foresters are also pretty much the same as other people, except that they seem to have unusually good posture, except that they don't seem to be as hurried as they might be, except that they probably use a fewer words per sentence than you and I. You get a sense, when dealing with foresters, of solidity, of — well — rootedness. The theme of this issue of the *Bulletin* is the DEP's Bureau of Forestry.

In this issue, we will continue our survey of the DEP's Hazardous Materials Management Unit. This time we will explore the asbestos and PCB sections, and look at the complexities of the inspection process. Also, we will discuss another continuing problem in Connecticut, the bulky waste situation.

We are happy to present one of Gale Carter's longer "Trailside Botanizer" articles. This little column has been — judging from reader mail — the single most popular item in the *Bulletin*. We know you'll enjoy this month's article, and we're grateful to Mr. Carter for sharing his vast knowledge and gentle writing style with us.

It's October. This is the best time to spend some time with the trees, to walk quietly among them, to catch their slow rhythms, to just be with them. No reason, no purpose, nothing beyond just being with them. One of the reasons it's so relaxing to be around trees is that they never seem constrained to justify their own existence.



The first settlers of Connecticut were greeted by a vast, largely-uninterrupted wilderness. (Photos: Robert Paler)

Connecticut's Forests

A look at the last 350 years

by
Ralph Scarpino
Forester II
Bureau of Forestry

It is difficult for us to imagine the kind of landscape the settlers found when they first arrived in our section of southern New England. It is generally agreed they were greeted by a large, mostly uninterrupted, hardwood and evergreen forest. There were some clear areas, but these were primarily restricted to areas adjacent to the major rivers and along the coastline.

"The Inexhaustible Resource"

This vast wilderness represented different things to the early Colonists. It represented to some an obstacle that restricted agriculture and homesteading. To others it represented a place that harbored ferocious wild animals. Still others looked at the forest for its seemingly inexhaustible supply of wood. It represent-

ed a source of heat and shelter, and was a significant factor in the early economy. Wood was used for planking, bridging, wagon wheels, and for smelting iron and brass. Ships' masts and timbers came from the forests. Indeed, America's first war vessel was built with Connecticut oak.

Soon, however, the landscape changed dramatically. The hillsides were stripped of their trees and large concentrations of unused residue fueled numerous, large forest fires. Connecticut's first 150 years were years of forest abuse. By early in the 1800s, the forests were all but gone.

The Return of the Forests

Over the next 100 years the forests, which had been cut so often, began to return. The forests' return was not the result of a hard battle won by an early conservationist coalition, but merely a reflection of a changing economy. Many farmers got fed up with eking out an existence and abandoned the farmlands for higher-paying jobs in factories. Other farmers moved to the more fertile lands of the Midwest. As a result, Connecticut's cutover forests and pastures began to grow back. The stone walls that criss-cross today's woodlands are reminders of that early era.

The 100 years between 1810 and 1910 saw a slow regrowth of the forest and an increasing concern for the woodlands. In 1866, the state board of agriculture was formed. One of the board members was Professor William Henry Brewer of Yale. Brewer is considered to have been the father of forestry in Connecticut. One of his students, Gifford Pinchot, a native of Connecticut, became the first U.S. forester, the first chief of the U.S. Forest Service, and founded the Yale School of Forestry. He was a close friend and advisor of Theodore Roosevelt.

The Connecticut Forest and Park Association was formed in 1895. This influential, non-profit group is still very active today. In 1901, the state Legislature first appointed a state forester. In 1913 a forest tax law was passed; it was the forerunner of the 1963 Public Act 490, which makes forestland eligible for tax concessions.

The early 1900s saw large-scale forest fires. Most of the fires were started intentionally by the railroads, and annually tens of thousands of acres burned. In 1915, it is estimated that 100,000 acres were scorched. Gradually, the fire frequency and size diminished. In the 1980s, between 1500 and 2000 Connecticut acres are blackened each year. Most present-day fires are caused by people, maliciously or by accident.

The Era of the CCC

The 1930s was the era of the Civilian Conservation Corps. The CCCs put young men to work during the height of the Great Depression. They fashioned woods



Connecticut's forests are unique in that on any given acre we may find six or eight different species of trees. Here, a hemlock and black oak grow together in Elizabeth Park in Hartford.



Connecticut ranks high both in population density and percent of forestland. This is an unusual combination.

roads, built recreation areas, cut wood, planted trees, fought fires, and established hiking trails. At one time, there were as many as 20 CCC camps scattered throughout Connecticut and, between 1933 and 1942, nearly 40,000 men were involved with the program. Many of the fine recreation areas we have today in our state parks and forests can be traced to the commitment of the Cs.

Connecticut's Wood Industry

Once the Colonists settled in Connecticut, the wood industry was here to stay. Throughout much of our 350 years, it has played a major role in the economy and landscape. Historically, the industry has ridden an economic roller coaster. When times were good and trees were big, the industry flourished; when the economy turned sour and the forest had been cut over, the industry lagged.



Once the Colonists settled in, the wood industry was here to stay. In 1984, the total value of processed lumber in Connecticut was 25 million dollars.

Today there are about 850 people employed in jobs directly related to Connecticut's forests. This figure is broken down as follows: sawmills - 480; logging - 324; others (foresters, etc.) - 50. According to the state Department of Economic Development, there are also approximately 2000 people employed in secondary manufacturing of wood products. These are the people who take the rough wood and make the chairs, flooring, fences, stairs, cabinets, signs, boxes, and handles. Annual payroll of these wood products and lumber people approaches \$48,000,000. This is not the largest payroll in the state, but it is certainly an industry to be reckoned with.

In 1984, 95 Connecticut sawmills processed about 74,500,000 board feet of wood. The total value of the processed lumber was in excess of \$25,000,000.

The problems loggers and sawmillers face are varied and complex. Social problems of landowner attitudes, non-landowner attitudes, changing land use patterns, and municipal regulations head the list. Insurance costs and some of the highest workman's compensation premiums in any industry continue to escalate. Competition is intense as many buyers jockey for available wood.

The Changing Economy

Ironically, competition from foreign log and lumber buyers was actually the salvation of the industry during the period of high interest rates and the sluggish economy several years ago. European, Arabian, and Far Eastern buyers discovered Connecticut oak. These outlets drove prices up and gave the woods workers a high-profit market. In turn, higher prices convinced some landowners to sell some of their trees, making more woodlots available.

The social problems the industry faces can be approached through education. Attitudes need to be adjusted, not only in terms of public opinion but within the industry itself. It seems loggers are becoming more sensitive to the feelings of landowners and the non-landowning public. Any "bad apples" need to be put on notice that the industry won't put up with poor practices. Loggers are in a position to help themselves.

A Survey of Connecticut's Forestland

Connecticut's forests account for about 58 percent of its land base. This places our tiny state in the top 10 of states in percent of forestland. We are also near the top of the list in population density. This is not a common combination and, as might be expected, results in special problems in our state.

Periodically, the U.S. Forest Service surveys each state's forest resources. In Connecticut, the last surveys were in 1984 and, before that, in 1972. Preliminary information from the 1984 survey is just now becoming available. Surprisingly, the gross forest

acreage does not appear to have changed a great deal over that 12-year span, hovering around 1.8 million acres. The more densely populated counties of Fairfield and Hartford, however, appear to have lost some forests, whereas the other six counties are holding their own, or even slightly increasing in forest acreage.

What does appear to be happening is an increase in the average size of the tree. Not surprisingly, we have increased the acres of sawtimber (trees greater than 12 inches in diameter measured at breast height — DBH). The gain in acres of sawtimber appears to be offset by an equally dramatic decrease in the acreage of seedlings (trees 1" DBH) and saplings (trees between 2" and 4" DBH). Our trees are growing.

Who Owns the Forests?

Connecticut's 1.8 million acres of forests are primarily in private ownership. Approximately 185,000 acres are owned by the state of Connecticut. Another 180,000 acres are either municipally-owned or are a municipal watershed. The other 80 percent is classified as non-industrial private. That is, it is owned by "average" citizens. There are about 50,000 of these average citizens. The average woodland size is about 30 acres. Over time, the number of forestland owners has increased, and will continue to do so; the average acreage will decline. The reasons for the ownership are as varied as the owners themselves; recreational pursuits, privacy, wildlife habitat, and investment are all prime reasons. Commercial productivity is generally not a high priority of the private landowner.

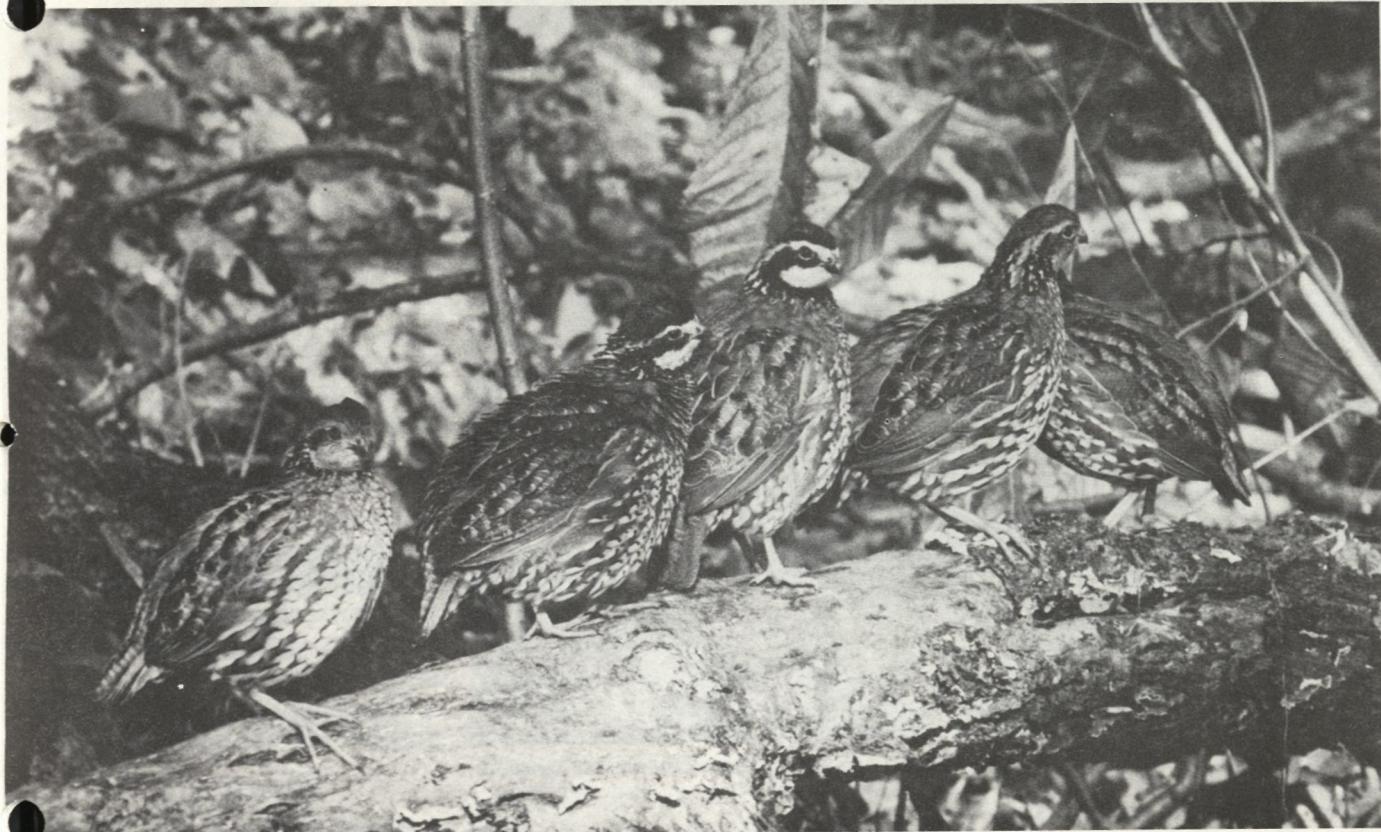
Connecticut's Transition Forests

Connecticut is also unique in its species of trees. We are located in a transition forest. Consequently, on any given acre, we might have six or eight major forest tree species. The upland central hardwoods, to Connecticut's southwest, include the red, white, black, scarlet, and chestnut oaks and shagbark, pignut, and butternut hickories. The northern forest type mixes in the sugar maple, yellow and black birch, and beech. Other common species include white pine, hemlock, white ash, and tulip poplar. As a general rule, the eastern half of the state has drier soils, and one is apt to find the oak, hickory, and pine types. The western and northern areas of the state tend to have more beech, birch, and maple.

Connecticut's landscape has changed dramatically since the Colonists first arrived. Since that time, forests have been cut, grew back, were cut again, and grew back again. The present woodland is diverse. A variety of owners have woodlots within different forest zones, with a variety of tree sizes, and a variety of species. All this reflects a complex sociological, biological, and economic matrix which is as big as our state, or as small as our own back yard. ■



Connecticut's woodland is diverse, with a variety as big as our state and as small as our own back yard.



Quail are gregarious in nature, forming coveys of about 30 birds. The covey holds together from late summer until spring when the mating season begins. (Photos: Leonard Lee Rue III)

The King of the American Game Birds

The bobwhite (*Colinus virginianus*) quail belongs to the order *Galliformes*, chicken-like birds with feet adapted for scratching. The bobwhite is much smaller than its upland game bird associates, the ruffed grouse or ring-necked pheasant.

The bobwhite is mottled-gray, brown, black, and white in color. A mature quail is about 10 inches long and weighs approximately six ounces. The male is easily distinguished from the female by its pure white throat and eye bands. In the hen, these markings are buff-colored. As usual in most birds, the hen is generally more modestly-colored than the cock.

Many people in the East think the bobwhite is the only quail re-

siding in the United States. However, there are 22 subspecies of quail that range from the eastern seaboard, west to Wyoming and south to Guatemala.

Colonial records indicate that quail were present in southern New England 300 years ago, along with other upland natives, including ruffed grouse, wild turkeys, and heath hens.

Colonial quail populations remained fairly stable in Connecticut until about 100 years ago, when diversified farming practices were replaced by specialization. Unlike the ruffed grouse, the bobwhite was detrimentally affected by habitat changes brought about by settlement and economic shifts. When it became cheaper to transport grains

from the Midwest than to produce them here, grain production in Connecticut dropped from an average of three acres per farm in 1880 to a fraction of an acre in the 1930s. Today grain production in Connecticut is almost nonexistent.

Bobwhite quail can be found primarily in southeastern Connecticut, with smaller populations found in the northeast section.

Reproductive Biology

Quail are gregarious in nature throughout most of the year, forming coveys composed of broods raised in neighboring territories. Coveys usually are made up of about 30 birds, often roosting shoulder to shoulder in order to keep warm during the winter months; a

Habitat Requirements and Management



Female bobwhite quail: As with most birds, the hen is more modestly colored than the cock.

few birds may even perch atop their neighbors. If disturbed when compactly grouped, they "explode" upward and outward like a small bomb. These coveys remain quite stable, and regroup after being flushed. Attempts to introduce bobwhites into new areas have not been successful, nor have attempts to bolster an existing stock with more southerly birds, for the progeny lack the vigor of the hardier existing stock.

Coveys hold together from when they are first formed in late summer until spring, just prior to the start of the mating season. It is at this time that males begin to announce their territories with the familiar "bob-white" whistle. The bobwhite is a ground-nester, with nesting activities usually under way in Connecticut by mid- to late-April. Nests are normally found in fairly open areas. An average of 12 to 15 creamy white eggs are deposited and incubated for 23 to 24 days. Quail are monogamous; they choose one mate and share

nesting responsibilities.

Approximately one third of all nests started are successful. If nests are destroyed prior to hatching, the hens will usually renest. Nest destruction or desertion can be caused by natural disasters (floods, fires, etc.) or by humans, dogs, house cats, or other predators. Of the chicks that hatch, less than one third survive to their first birthday.

Food Habits

Like all other wildlife species, quail have certain requirements which are crucial to survival. Adequate food, protective cover and water, along with dusting and roosting sites, are important to the bobwhite. Food habits vary with the season and the age of the bird but, in general, insects, grain, and wild seeds make up the bulk of the diet. Insects provide protein, which is essential to the growth of young chicks. The seed portion of the quail's diet is usually associated with plowed crop or hay fields.

Without good habitat, quail populations are severely affected. The bobwhite requires several habitat types: grass in the spring and summer for nesting and brood rearing, cropland for fall and winter feeding, and brushy woodlands for escape and roosting cover. Additionally, all of the habitat types must be within a quarter of a mile of each other. The grass habitat is usually the limiting factor for quail, as it is often mowed or converted to cropland.

The value of a hedgerow to the bobwhite is great. A 10- to 12-foot wide strip of grass and shrubs will serve just as well as a hedgerow of multiflora rose.

The following are recommendations to improve quail habitat:

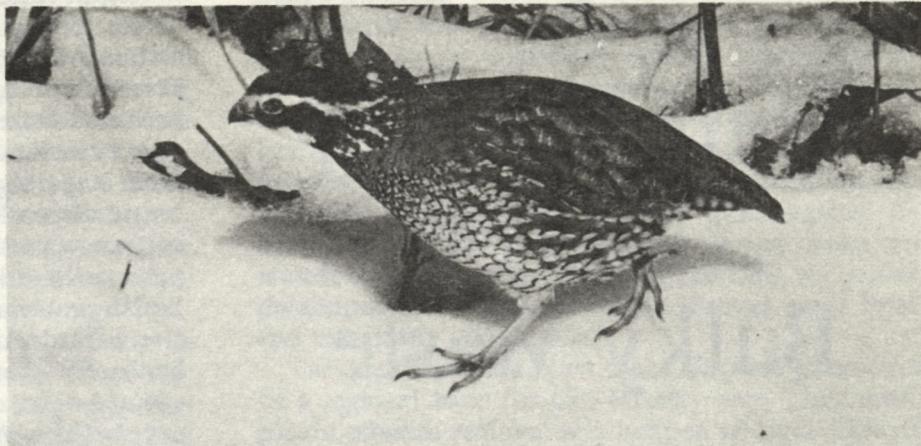
1. Leave a grass border of at least five to 12 feet along the edges of agricultural fields.
2. Keep ditch banks in undisturbed grass.
3. Allow field corners, borders, and rights-of-way to grow up in natural cover.
4. Mow or burn extremely dense thickets.
5. Avoid widespread use of chemicals and pesticides.

Economic Benefits

The bobwhite quail is commonly referred to as the "king of native American game birds." In some southern states, the bobwhite is still the most important game bird. In Connecticut, quail populations are limited. Hunting, though allowed, is not extensive and is not considered detrimental to the population. The bobwhite's rapid, erratic flight, together with its small size, make a challenge for the upland gunner. It is regarded as one of the most delicious table game birds.

Predators of bobwhite quail, which prey heavily during harsh winters, include foxes, owls, hawks, and stray cats and dogs.

The Technical Assistance Information Series is 75 percent funded by Federal Aid to Wildlife Restoration — the Pittman-Robertson (P-R) Program. The P-R Program provides funding through an excise tax on the sale of sporting firearms, ammunition, and archery equipment. The remaining 25 percent of the funding is matched by the Connecticut Wildlife Bureau. ■



Male bobwhite quail: The predators of the bobwhite quail seem to prey more heavily during harsh winters.

For Your Information

October's Environmental Events

by

Leslie Lewis

Citizens' Participation Coordinator

"Environment/2000"

October will be a busy month for environmental meetings, conferences, and workshops. The "Environment/2000" conference will be held on Wednesday, October 8. Details appeared in last month's *Citizens' Bulletin*, but you can contact Tessa Gutowski at 566-7049 for last-minute registration.

Emergency Response Plan

The Bhopal, India, chemical disaster and a number of similar incidents prompted Governor O'Neill to form a state-wide task force on Accidental Toxic Chemical Releases. Representatives from industry, local government, public safety officials, citizens groups, and state agencies have

been working for almost a year to develop a comprehensive emergency response plan for Connecticut municipalities. The plan will be discussed at a conference on Wednesday, October 15, at the Parkview Hilton in Hartford. Governor O'Neill and DEP Commissioner Stanley J. Pac are scheduled to address the meeting. A registration fee of \$15 covers lunch and materials. If you would like more information, get in touch with Chris Cooper at 566-2110.

CACIWC Meeting

A different type of event is planned on October 23 for the annual meeting of the Connecticut Association of Conservation and Inland Wetlands Commissions (CACIWC). Dr. Nobel Proctor, professor of biology at Southern Connecticut State University, and Harvey Smith, wildlife biologist for the U.S. Forest Service, will give presentations on forest animals with an emphasis on natural predators of the gypsy moth. This dinner meeting will be held at the Yankee Silversmith Inn in Wallingford, and a \$25 registration fee will be charged. Contact Leslie Lewis at 566-3489 if you are in-

terested in attending.

GLOBESCOPE: II

On October 24, 25, and 26, environmentalists will be joined at Tufts University by leaders in business, government, and civic affairs from the United States, Canada, and around the world to discuss critical, long-term trends in global environment, development, resources, and population at GLOBESCOPE II: An International Forum. This will be the first conference to include leaders from both New England and eastern Canada in discussions of regional environmental issues. Over 40 workshops and keynote addresses will cover a wide range of issues, including acid rain, hazardous waste, water supply, nuclear policy, fisheries, international development agencies, endangered species, agriculture, environmental ethics and population.

For a brochure or additional information call Michele Zador or Nancy Anderson at (617) 381-3451 or write to GLOBESCOPE II, Lincoln Filene Center, Tufts University, Medford, MA 02155. A summary of the record of proceedings is planned for publication and attendance will be limited by space availability. ■

A Half Million Tons of Bulky Waste

by
Thomas H. Pregman
Principal Environmental Analyst
Solid Waste Management Unit

Municipal solid waste makes up 70 percent of all the solid waste produced in Connecticut. Another 10 percent of the total is hazardous waste. The remaining 20 percent consists of a variety of materials that have been grouped under the term "special wastes." Special wastes are produced in every municipality in varying amounts. Their safe disposal is an important and necessary consideration for each of the 169 cities and towns in the state.

Special wastes have been broadly defined in Connecticut administrative regulations as "solid wastes which require special handling." Their chemical or physical characteristics make them a handling problem or a potential pollution threat at a landfill.

What is Bulky Waste?

One of these materials, bulky waste, consists of building demolition and land clearing debris, such as brush, tree stumps, and wood. Bulky waste is massive in volume and is not easily compacted. It accounts for nearly 75 percent of the special wastes produced in the state. It is produced in every municipality in quantities that can dramatically increase as a result of fire, natural disaster, urban renewal, and land development.

The DEP estimates that approximately 500,000 tons per year, about 15 percent of the 3.2 million tons of waste Connecticut generates each year, is bulky waste. These materials are not processed by energy recovery facilities and always require landfilling. The bulky waste disposal problem cannot be approached in the same manner as the municipal solid waste crisis — through development of waste-to-energy facilities.

All landfills, whether for municipal waste or bulky waste, produce leachate. Leachate is the liquid which passes through the landfill from infiltrating precipitation, or ground or surface waters, and carries with it suspended or dissolved contaminants. The leachate produced from landfilling of bulky wastes is of concern even though it is not as strong as that produced from a garbage landfill. Mismanagement of bulky waste disposal can result in pollution of ground or surface waters, including water supplies. It can also potentially destroy wetlands by filling, and create health problems by providing rodent harborage, create fire hazards, or bring about exposure to friable asbestos. For these reasons, in February, 1985, the DEP adopted new, more stringent regulations in regard to new bulky waste disposal sites, as well as in regard to the operation of existing facilities.

New Regulations

In particular, the new regulations control more closely the types of materials which may enter a bulky waste site. The elimination of spring cleanup wastes and construction debris should eliminate packaging, garbage, paints, solvents, and other pollutants from these sites.

All municipal mixed waste disposal sites can receive bulky wastes. These sites, however, are already at critical level. Most permitted capacity in Connecticut is expected to expire in the next few years.

In addition to regulatory controls, insurance rates have increased significantly. Since 1984, a total of 10 private bulky waste disposal sites have been (a) filled and closed, (b) restricted to owner-use by several operators, or (c) closed by DEP legal actions. The user fees at the few remaining sites have more than tripled from \$150 to \$500. These circumstances, coupled with the public's fear and opposition to establishment of new sites, have resulted in most demolition, land clearing, and construction debris being uncontrollably dumped in someone's backyard.

The Role of the DEP

The DEP becomes aware of unauthorized sites through citizen complaints. These have greatly increased from 1985 to the present. Two field inspectors now spend virtually full time in this area instead of inspecting community landfills. From January, 1985, through April, 1986, the DEP investigated and acted on 103 illegal dumping sites in 64 towns. This is only the tip of the iceberg.

Approximately half of the violations were small, and were corrected by removal to legal sites. Thirty-two others were issued notices of violation and

required follow-up work. In eight cases, the sites were extensive and required site plans and/or pollution studies. Several cases are still pending. Figure 1 depicts the locations, by town, where these sites were in use.

Sections 22a-220 and 22a-220a of the Connecticut General Statutes require each municipality to make provision for disposal of all wastes that are not toxic or hazardous. As modified by Public Act 85-334, municipalities can require use of specified sites. In a letter dated October 14, 1985, DEP Commissioner Stanley J. Pac requested each chief municipal official to report provisions made for disposal of demolition material, land clearing debris, and wood.

Only 69 towns responded. Some of the 100 towns not responding have DEP-permitted bulky waste disposal sites. The Connecticut Resource Recovery Authority (CRRA) responded for eight interim service towns, assuming ultimate responsibility to provide for such disposal for them, at cost. Provision, if any, by the remaining 85 towns is uncertain. Experience has also shown that despite the response and existence of permitted municipal sites, many in fact do not accept stumps or refuse from private demolition contractors.

Steps toward Solution

What must be done to solve the environmental problem of uncontrolled disposal and provide for safe management of these wastes?

The state demolition office has licensed from 170 to 180 demolition contractors and may, with the DEP, act on license revocation and/or suspension for disposal violations.

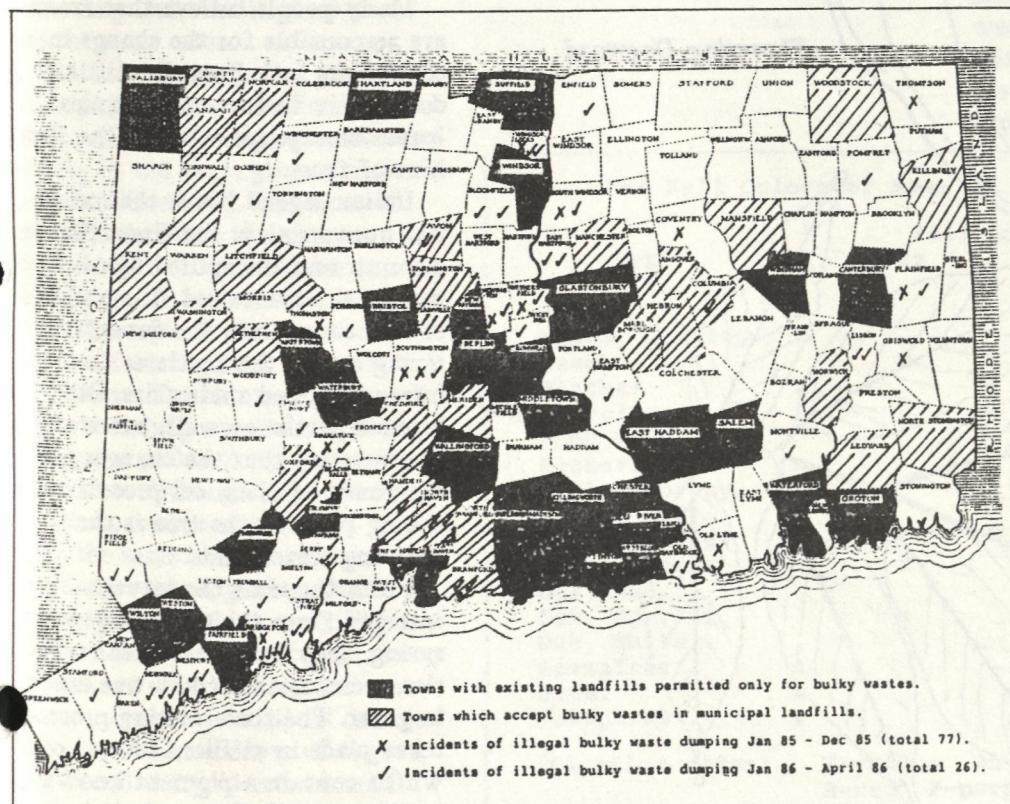
The state must provide leadership in planning and continue a strong regulatory position, specifically in its 1987 State Waste Management Plan. The DEP will recommend interim development of new regional landfills, and long term inclusion of some materials in resource recovery facilities through separation and shredding. The DEP will continue to act against illegal dumping and order land owners and dump operators to remove waste deposits. The DEP will order municipalities to make provision through more local and reasonably priced sites.

The municipalities must make disposal provisions on a regional basis for cost effectiveness. They must ensure asbestos removal and location of legal disposal prior to permitting demolition or construction projects. Municipalities must share existing facilities and promote or support new public and private facilities.

Contractors must comply with the law in disposing of their wastes. They must pressure the municipalities into making reasonable provision for this disposal. They should look into development of other private regional disposal facilities.

And finally, the DEP asks for the continued support of the citizens of our state, both in reporting violations and in working together in the best interests of everyone. ■

Figure 1: Legal and Illegal Dumping of Bulky Wastes in Connecticut



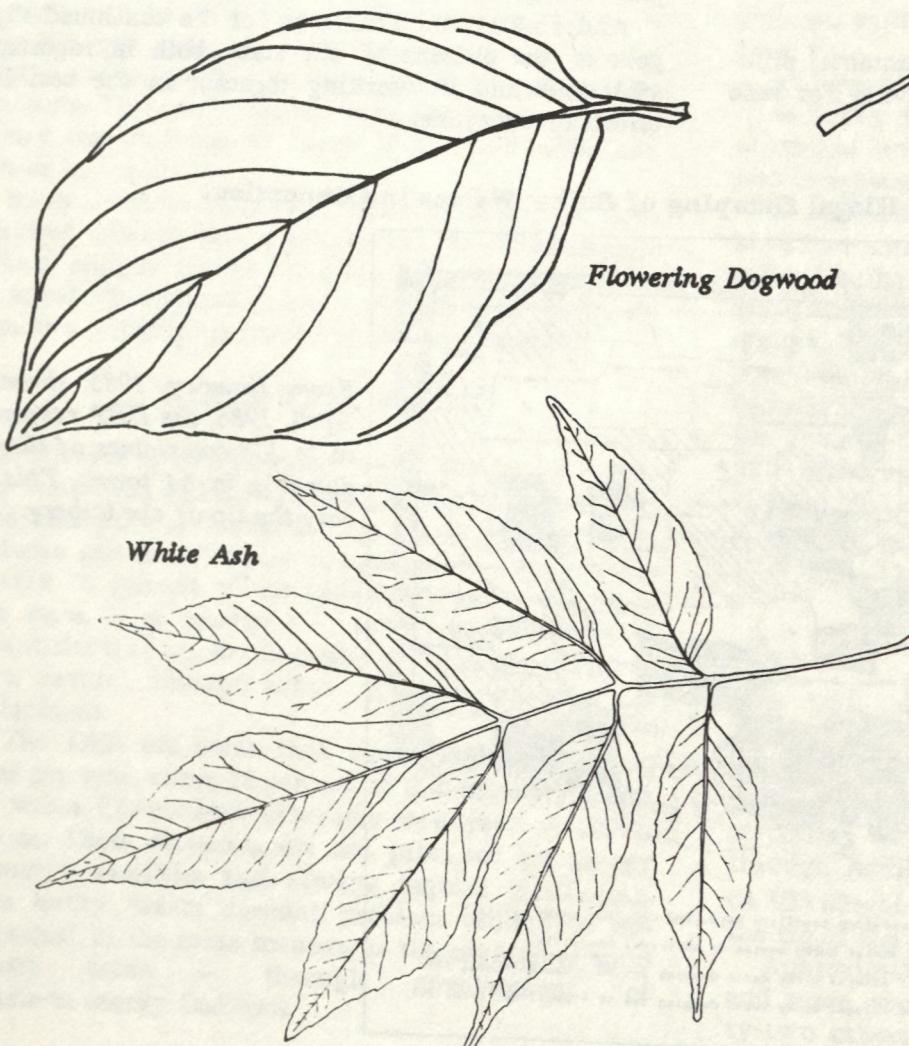
From January, 1985, through April, 1986, the DEP responded to 103 complaints of illegal dumping in 64 towns. This is only the tip of the iceberg.

The Symphony

Text and I
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Don
Fore
Bureau o

After a long, hard spring and summer of growing Connecticut's forests, during the fall Mother Nature kicks up her heels one last time before the long winter ahead. Every year at this time the greens of summer yield to a symphony of color which is breathtaking in its scope and grandeur, yet reassuring in its annual regularity.

A walk in the woods is a singular experience in early October. A swirl of wind brings a shower of color, spinning and dancing to the ground. Footsteps rustle through a patchwork quilt of fallen leaves. The air is crisp and gives just a hint of the barren coldness of November. While all around you colors are bright, showy, and full of excitement, there is yet a quietness within you. A gentle satisfaction comes of knowing that you can depend on Mother Nature to keep her schedule — no matter how hectic the pace of the world.



Red Oak

Sugar Maple

Flowering Dogwood

White Ash

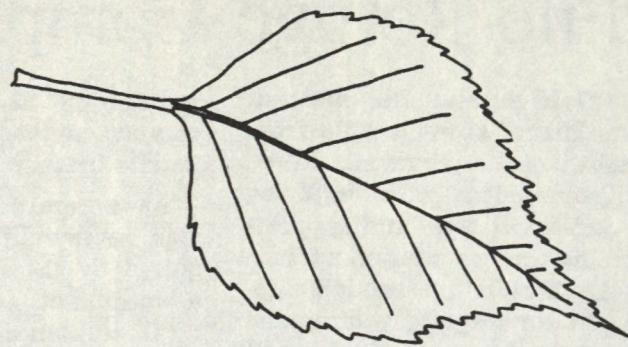
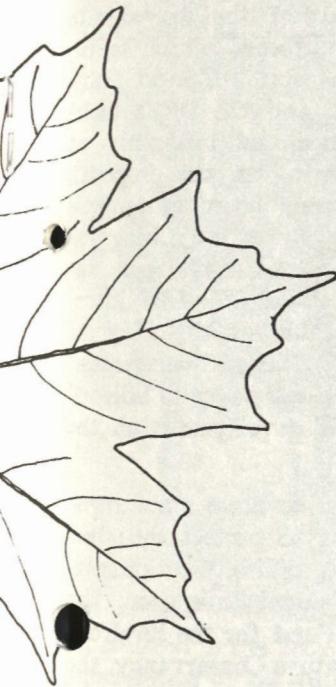
Many people believe that frosts are responsible for the change in colors, but Jack Frost has little to do with it. In fact, many times leaves change color before the first hint of frost.

Indian legend has it that celestial hunters slew the Great Bear in autumn and the spilled blood turned the leaves red. The yellows of fall came from the fat splattering out of the kettle as the hunters cooked their prize. Other legends persist as well, but we know today that the changes are the result of chemical processes taking place in the tree as the growing season ends.

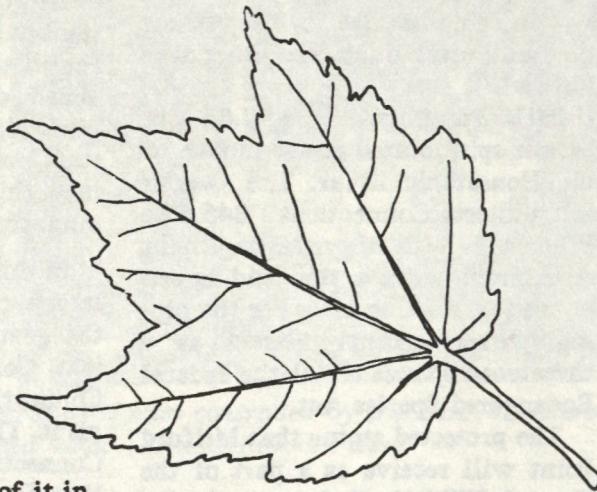
From the time the leaves emerged from the green buds in spring, they have served as factories, creating the food a tree needs to grow. The food-making process takes place in millions of leaf cells which contain a pigment known as chlorophyll. Chlorophyll is

Symphony of Fall

Illustrations
by
Smith
ster II
of Forestry



White Birch



Red Maple

green and there is so much of it in a growing leaf that it gives the leaf its green color.

But, in addition to the green chlorophyll, leaves also contain some yellow or orange carotenoids which, by the way, give carrots their familiar color. For most of the year, the little bit of yellow/orange carotenoid color is hidden by the huge amounts of green chlorophyll. But, in the fall, the food factories shut down for the winter. The chlorophyll breaks down and the green fades away, letting the yellow/orange carotenoids blaze forth, giving autumn its splash, dash, and panache.

At the same time, other chemical changes occur, giving rise to more pigments which vary from yellow to red to blue. It is to these changes we owe the reds and purples of sumac, the brilliant orange or fiery red and yellow of sugar maple, and the golden bronze of beech.

The fall weather reaches a point where the days are warm enough for the food factories to operate, but the nights are too cold for the sugars which are produced to move downward in the tree. In the presence of bright light, the sugars trapped in the leaves form the red pigments, anthocyanins. The brighter the light, the greater the production of anthocyanins, and the more brilliant the colors we see. When the days of autumn are bright and cool, and the nights chilly, but not freezing, the brightest foliage colors will develop. Familiar trees with red or scarlet leaves are red maple, dogwood, red oak, scarlet oak, and sassafras.

Only a few regions of the world have seasonal displays of color like Connecticut's. The eastern United States and southeastern Canada have large areas of deciduous forests, ample rainfall, and favorable weather conditions for vivid fall colors. However, eastern Asia, southwestern Europe, and some areas of the western United States (notably the mountains) have bright fall colors.

When's the best time to plan on viewing the fall spectacle? Well, keep the week before and the week after Columbus' Birthday in mind. For Connecticut, the peak viewing time usually comes sometime during that period. ■

The Fall Colors of Some of Connecticut's Trees

Tree	Y	Fall Colors (*)				
		Bz	O	R	P	Bn
Ash	x			x	x	
Aspen, Quaking	x					
Beech		x				
Birches	x					
Cherries	x			x		
Dogwood				x	x	
Hickories	x					
Maple, Norway	x					
Maple, Red	x			x		
Maple, Silver	x					x
Maple, Sugar		x			x	
Oak, Red				x		
Oak, Scarlet		x			x	
Oak, White				x		
Sassafras	x		x	x	x	
Sumac	x		x	x	x	
Tuliptree	x					

(*) color codes: Y-yellow Bz-bronze O-orange
R-red P-purple Bn-brown

Coastal Management Program

National Wildlife Refuge Completed

by

Diane Giampa

Senior Environmental Analyst
Planning/Coastal Area Management

This past May, the fourth and final piece was added to Connecticut's new Coastal National Wildlife Refuge with the purchase of the 10-acre beach at Milford Point by The Nature Conservancy for \$650,000. Temporarily, the Point will be leased to the U.S. Fish and Wildlife Service for a nominal fee, and eventually ownership will be transferred to the federal agency.

The Connecticut Coastal National Wildlife Refuge System was established by an act of Congress on October 22, 1984, and is the first Wildlife Refuge System to be authorized by Congress in the Northeast in 10 years. The legislation designated four separate land units for acquisition, totaling about 150 acres of wildlife habitat of importance to several species, such as the tern, piping plover, and heron.

Chimon Island, located 1.5 miles off the coast of Norwalk, was purchased for \$1.4 million by the U.S. Fish and Wildlife Service from The Nature Conservancy in March, 1985. The 70-acre island supports the most important heron rookery in Connecticut and one of the three largest wading bird colonies in the Northeast.

Falkner Island, covering about five acres, is located three miles off the coast of Guilford. It was transferred to the Service in July, 1985, by the Coast Guard, which will continue to maintain the lighthouse, the boat dock, and other navigational facilities. The island is Connecticut's only significant habitat for the roseate tern, considered a rare and endangered species by the state. Falkner is also the nesting area for 80 percent of Connecticut's population of common terns.

Sheffield Island lies west of Chimon Island, about a mile from the mouth of the Norwalk River. The 67-acre island is covered by brush and small trees and supports a small nesting population of herring gulls. Sheffield Island is a stopping point for migratory birds and is the home of a variety of small mammals and 50 to 60 species of birds. The surrounding waters serve as wintering habitat for the Atlantic brant, black duck, and other waterfowl.

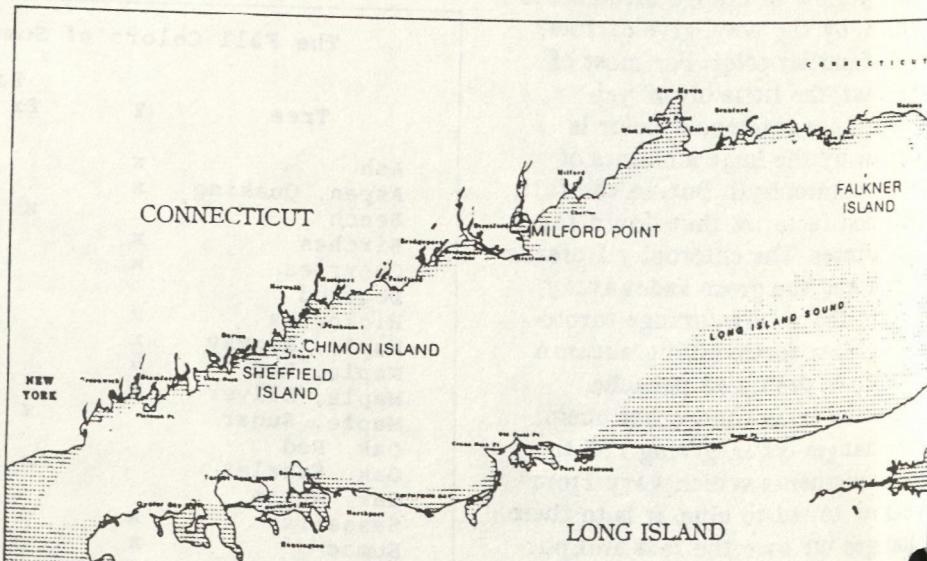
Milford Point is a 7.65-acre barrier spit, located at the mouth of the Housatonic River. The barrier spit protects Connecticut's 845-acre Wheeler Wildlife Management Area from wave action and is one of the few nesting areas for the piping plover, recently listed as a threatened species under the federal Endangered Species Act.

The protected status that Milford Point will receive as a part of the Coastal Wildlife Refuge is particularly gratifying since, despite the area's sensitive resources and vulnerability to storm and flood damage, a developer recently proposed

building a 22-unit condominium complex on the federally-designated barrier beach.

As a result of the coastal site plan review process, which is required by the state's Coastal Management Act, and the DEP's technical assistance and testimony at the local hearing on the proposal, the city's zoning board of appeals denied the developer the zoning variance. When the developer appealed this decision, the DEP intervened on behalf of the City of Milford, and Coastal Management staff provided assistance to Milford in prohibiting development on the sandspit.

In addition to these state regulatory efforts to protect the area, the governor's office, the Connecticut Congressional delegation, the Connecticut Fund for the Environment, The Nature Conservancy, the Connecticut Audubon Society, the New Haven Bird Club, the National Audubon Society, and the U.S. Fish and Wildlife Service played key roles in the protection of Milford Point.



Milford Point, purchased by The Nature Conservancy, is the fourth and final piece in Connecticut's Coastal National Wildlife Refuge. A total of about 150 acres are protected under this program.



In addition to the 180,000 acres of forest controlled by the DEP, the Bureau of Forestry is responsible for the management of all state-owned land. (Photos: Robert Paier)

Report from the Bureau of Forestry

The state forester reviews the last five years of DEP's forest programs

by
Robert L. Garrepy
State Forester
Bureau of Forestry

State Forest Nursery

During the period from 1980 to 1985, the Pachaug State Forest Nursery in Voluntown provided nearly 10 million tree and shrub seedlings for Connecticut landowners. More than 12,100 acres were planted with superior stock grown from local seed sources.

Mandated by statute to sell seedlings at the approximate cost of production, the Nursery generated revenues of some \$550,000 during this five-year period.

In 1985, a program was initiated to provide up to 1000 trees at no cost to municipalities for Arbor Day celebrations. Nearly 29,000 seedlings were planted on town lands in the first year, with greater partici-

pation expected in the future.

Pachaug is the only public tree nursery in southern New England. Seedlings in excess of Connecticut needs are sold to Rhode Island and Massachusetts.

State Lands Management

The Bureau of Forestry is responsible for woodland management of all state-owned lands, in addition to the 180,000 acres of forest controlled by DEP.

Emphasis is placed on DEP-owned land, however, and an active forest products sales program has generated a revenue value of \$2,135,000 over the past five years. Production included some 73,000 cords of fuelwood; this is somewhat less than the previous five-year total, but still equal to saving 11 million gallons of fuel oil. Sawtimber sales exceeded 17 million board feet — about five percent of the total harvested in the state. More than 6,500 Christmas trees were grown and sold at Goodwin State Forest.

An innovative and aggressive sawtimber stumpage exchange program enabled the DEP to improve its facilities at minimal cost. Forest products were offered on a competitive-bid basis, and the DEP was able to have approximately 29 miles of forest access roads built. The DEP also received two complete log cabin buildings for state parks; obtained 750,000 board feet of lumber for facility maintenance; and took ownership of 124 acres of woodland added to Meshomasic State Forest.

In cooperation with the U.S. Forest Service, the Northeast Forest Experiment Station, and the Con-

nnecticut Agricultural Experiment Station, two major studies were conducted on state forest lands. The first was a water quality experiment involving a variety of tree cuttings on small watersheds to explore effect of harvesting on stream water quality.

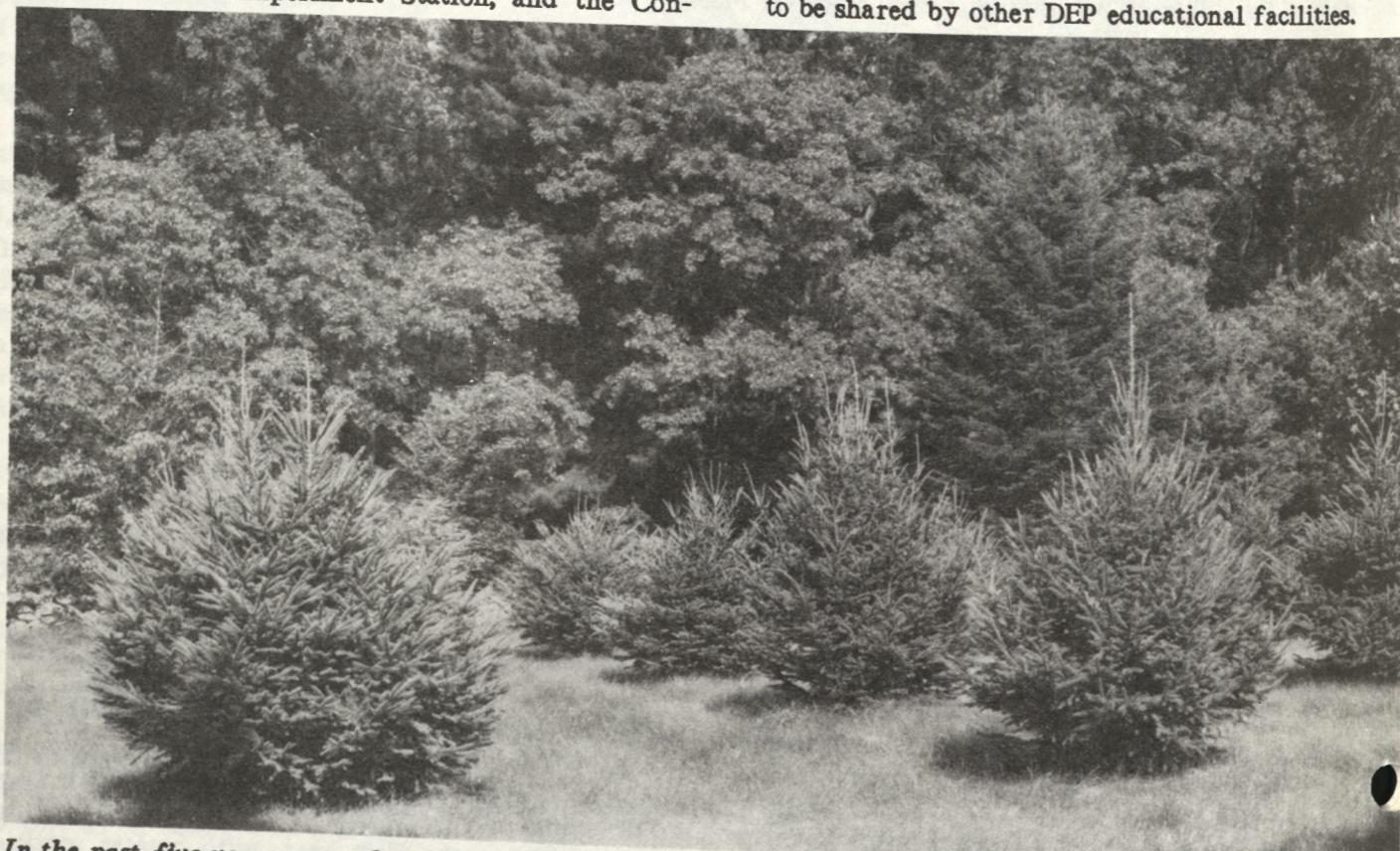
A second experiment involved aerial spraying for gypsy moth control, using several formulations of the natural insecticide "Bt" (*Bacillus thuringiensis*). More than 1000 acres were treated, with results still to be announced. Extensive contiguous forest land, like that managed by DEP, is ideal for large-scale experimentation.

Goodwin Conservation Center

Goodwin Conservation Center, dedicated to forest resource conservation and management, continued an active program of public education. A variety of workshops, tours, lectures, and educational programs were offered, and some 36,000 attendees visited the Center. In addition, Director Lois Kelley and forest field staff conducted educational programs at near-by schools and at the Hartford Civic Center which were attended by more than 17,000 people.

The dam at Pine Acres Lake was completely rebuilt and, after two dry years, the water level is again high enough to support sport fishing and provide water fowl habitat.

Use of the Center has grown to the point where better public educational facilities are needed. Plans are under way to build a new, larger Visitors' Center. Programs and displays used at Goodwin are designed to be shared by other DEP educational facilities.



In the past five years, more than 6,500 Christmas trees have been grown and sold at Goodwin State Forest.

Cooperative Forest Management

The Cooperative Forest Management Program (CFM) is a comprehensive title describing a variety of technical forestry advice and assistance provided by DEP personnel to the private sector, including private forestland owners, conservation groups, municipalities, and the forest products industry. During the period from 1980 to 1985, more than 7,000 owners, holding some 80,000 acres of woodland, received advice on forest management, wildlife habitat development, watershed protection, and recreational opportunities. As a result of visits by service foresters, landowners harvested sawtimber valued in excess of \$75,000, and cut more than 15,000 cords of fuelwood equal in heating value to 225,000 gallons of oil.

Some 1,300 requests for assistance from municipalities were serviced. Advice was provided on shade and ornamental tree maintenance, insect and disease control, town forest management, and Arbor Day activities.

Forest Fire Prevention and Control

The past five-year period was characterized by both averages and extremes of fire occurrence. There was a total of 8,776 forest fires which burned about 22,330 acres, or an annual average of 1,755 fires and 4,466 acres. However, 1983 provided one extreme, being generally cool and wet, with the smallest number of fires reported in a decade (946) and the least acreage burned.

At the other extreme, 1985 was characterized by a precipitation deficit of 20 inches. A very dry spring and summer led to "high hazard" conditions with 2,220 fires, involving 6,900 acres — the greatest area burned since 1943. Including expenses incurred by both the state and by local fire departments, forest fire control in 1985 cost more than one million dollars in Connecticut.

In addition to the in-state problems during the past year, Bureau of Forestry personnel assisted in suppressing the large fires that plagued the western United States. A specially-trained crew was sent to the Big Sur area of California for two weeks to fight the 120,000-acre Gorda-Rat fire. Western fire details provide excellent training for Connecticut firefighters. All trip expenses were reimbursed by the U.S. Forest Service.

In addition to traditional fire control programs, the Bureau administers the federally-funded Rural Community Fire Protection (RCFP) program. Local fire departments match federal monies for purchasing fire-fighting equipment. A total of \$137,000 was distributed to 145 fire departments for a total program commitment of more than \$289,000. Only rural towns — those with populations of less than 10,000 — can qualify for the program.

Miscellaneous Programs

Complementing the major programs administered by the Bureau of Forestry, other special projects were completed:

Forest Inventory — Forestry personnel assisted the U.S. Forest Service in conducting a state-wide inventory of forest lands in 1983.

Biomass Energy Project — In cooperation with the federal Department of Energy, the Council of Northeastern Governors, and the State Energy Office, Office of Policy and Management, Forestry Bureau staff conducted several state-wide surveys to develop data on the availability and use of wood in Connecticut.

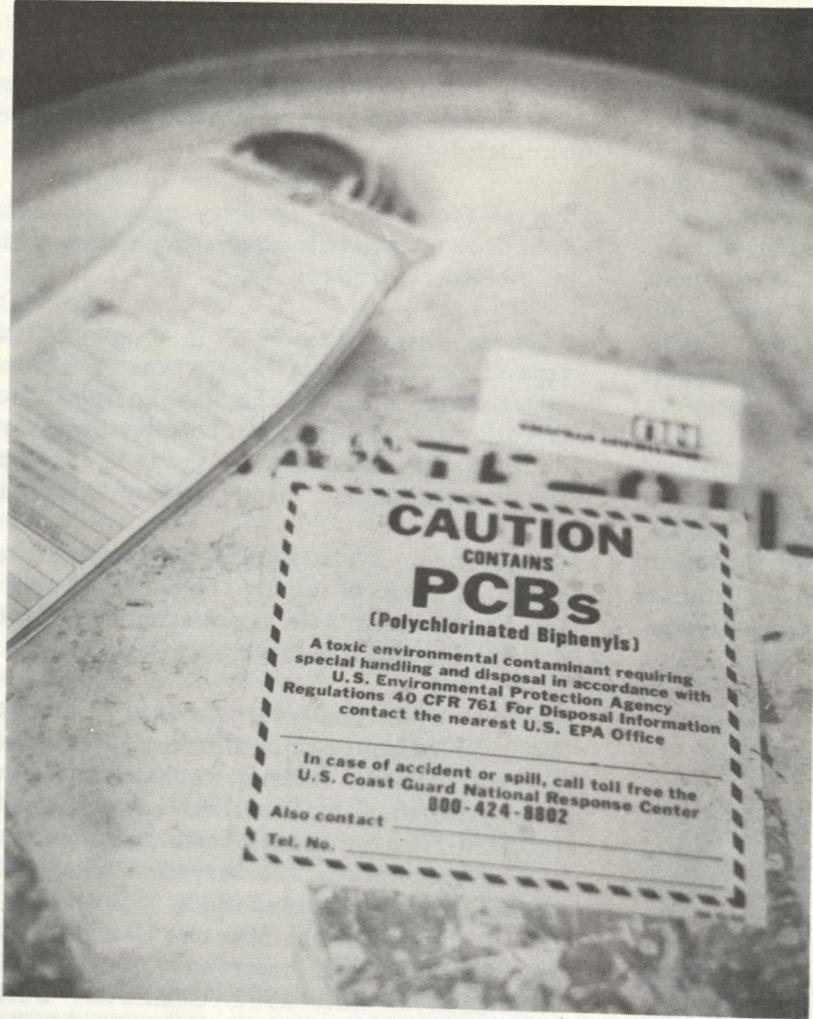
Conferences — The Bureau of Forestry hosted two major conferences during the period of this report — the Northeastern Area Association of State Foresters, and the Forest Fires Protection Commission.

Natural Area Preserves Advisory Committee — In 1982, DEP Deputy Commissioner Dennis DeCarli appointed the state forester as chairman of an *ad hoc* committee to revitalize the Natural Area Preserves Program. Committee membership included natural resource agencies and conservation groups. Based on Committee recommendations, Governor William O'Neill designated the 600-acre Hammonassett Marsh as a Natural Area Preserve in 1985, the first such establishment since 1972. Committee work is progressing on two sand plain areas, with designation expected in 1986. ■



The Bureau of Forestry provides advice on forest management, wildlife habitat development, watershed protection, and recreational opportunities.

Dollars and Detective Work



DEP's PCB/Toxics Group maintains a stringent enforcement program to prevent environmental problems

Text and Photos
by
Kim Nauer
Environmental Intern

The inspection of the power company continued for 45 minutes. It became clear to all involved that it would be thorough and exacting.

"I'll note here that you believe those transformers were inspected in '81, '82, and '83," said DEP Field Inspector Jacques Gilbert. "But, you understand, of course, . . ."

"Yes, yes," said the company crew supervisor. "I know. You'll need proof."

The supervisor stated he was sure the inspections were complete because he had done some of them himself. But, he added as he got up, he would try to find the records.

This particular inspection was one of the approximately 150 per year performed by the PCB/Toxic Group, under the direction of the DEP's Hazardous Materials Management Unit. In addition, this unit was involved in 20 major PCB-site cleanups and, as a

direct result of its enforcement actions, accounted for a half million dollars in federally-assessed penalties in the past year. It also responds to about 20 asbestos emergencies per year.

PCB inspections are a fundamental requirement of the federal Toxic Substance Control Act (TSCA). Detailed questions and on-site detective work are needed to make sure businesses are in compliance with the complex laws on manufacturing, labeling, storage, distribution, and disposal of specified hazardous substances.

Inspecting is delicate work, requiring expertise and diplomacy. The inspections take a great deal of a company's time, and compliance requires knowledge of complex laws. The bigger companies often hire staff to keep up with the municipal, state, and federal regulations, and yet dangerous violations may still go unnoticed. Gilbert mentioned one corporation that recently had to spend over a million dollars on cleanup and pay \$25,000 in fines after it had recycled PCB-laden hydraulic oil into its oil system. "They lost track of it," Gilbert said. "It fell through the cracks."

What are PCBs?

PCBs — polychlorinated biphenyls — are part of the chemical family of chlorinated hydrocarbons. They range in consistency from a heavy, oily liquid to a waxy solid. They have a high boiling point, a high degree of chemical stability, low solubility in water, high solubility in fat, low flammability, and low electrical conductivity. These properties make them ideal coolants in electrical transformers and capacitors. Although production of PCBs has been banned, they continue to be in use in many still-functioning systems.

PCBs are suspected to be hazardous at very low levels. Exposing animals to PCBs under laboratory conditions has resulted in reproductive failures, birth defects, gastric disorders, skin lesions, swollen limbs, cancers, tumors, and liver disorders. In 1968, the effect of PCB poisoning on humans was demonstrated dramatically in Yosho, Japan, when oil leaking from a heat exchanger contaminated a vat of rice oil. Over 1,300 people experienced the "Yosho disease," with symptoms ranging from fatigue and abdominal pain to nerve disorders and some fatalities.

PCBs are among the most stable chemicals known; they decompose very slowly after release. They are stored in fatty tissue and are increasingly concentrated as they move through the food chain. Ultimately, this may result in a high human exposure.

A major example of PCB-contamination in Connecticut was discovered in 1977, with the pollution of the Housatonic River by a Massachusetts General Electric plant. The company has been ordered to design a cleanup plan.

The Asbestos Problem

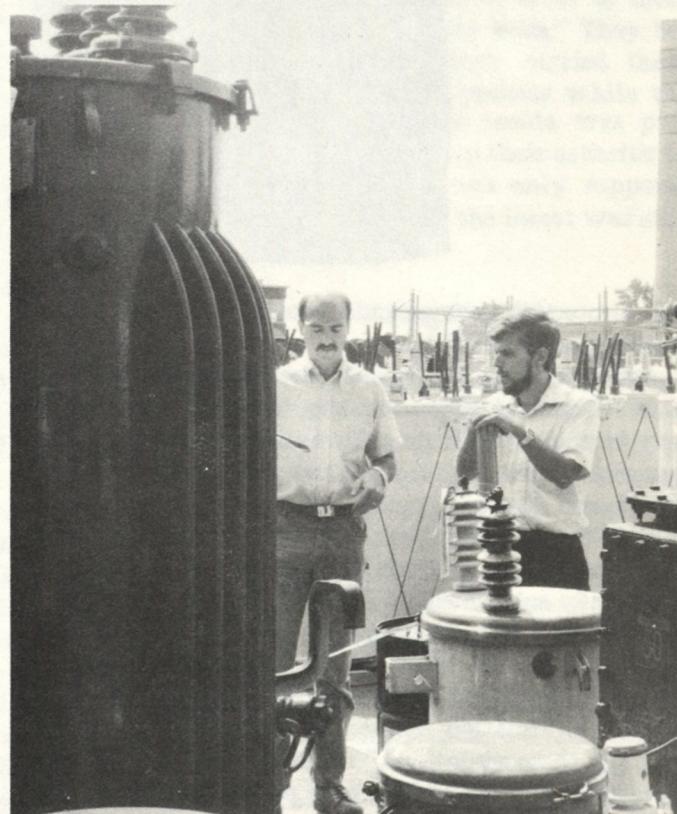
The PCB/Toxics Group also works with the DEP's Oil and Chemical Spills Section, and will respond to any PCB or asbestos emergency. Federal funds, however, have been allocated for PCB-related problems only, according to program coordinator Scott Deshefy.

"In order to assist federal inspectors, we have an understanding that if we see any violation, we will report it to the Environmental Protection Agency," Deshefy said. "We have discussed expanding the TSCA program to provide for both PCBs and asbestos, but at this point neither the state of Connecticut nor the EPA has provided funding to do that," he said.

Asbestos is a fibrous insulating product known to cause lung and respiratory problems after exposure. Its use in the U.S. began in the 1920s, and became widespread during the building boom of the 1950s and 1960s.

Deshefy said he does not know how much is out there; he doubts that anybody does. "It's been used since ancient times," he said. "It is said that Charlemagne had an asbestos tablecloth that he would impress his friends with, because he could clean it by burning it." Even then, Deshefy explained, it was evident that Roman slaves suffered from the toxic effects of working in asbestos mines.

More recently, asbestos has been commonly used for insulation. It has also been used in acoustical and floor tile, brake pads, pipes, fire retardant clothing, chem-



Jacques Gilbert (left) performs an on-site inspection to make sure the service facility is separating and labeling its contaminated equipment and parts.

"It often comes down to dollars versus protecting the environment. Protecting life has no price tag."

Scott Deshefy



ical protection compounds, boiler insulation, and building material filler.

Asbestos, however, is only dangerous in its friable state, when the fibers can be released. While there may be some buildings where disintegrating asbestos material is present, in most cases the fibers are contained and the only public danger is improper removal. "That, in fact, has been a more serious problem than leaving the asbestos in," Deshefy said.

Deshefy said that the EPA has begun to prosecute people involved in the illegal removal of asbestos. The first legal action taken in Connecticut for asbestos violations occurred in Bridgeport after the DEP referred the violation to the EPA. "People have served time for these violations," he said. "In this case, there were fines up to \$25,000, two people were placed on probation for five years, and there was a one-year prison sentence, suspended after 30 days."

So far, there have not been many asbestos cases, but

the number is increasing. "These are fairly recent regulations and the Bridgeport case was an important, precedent-setting step," Deshefy said.

L.U.S.T. Leaking Underground Storage Tanks

In addition to the PCB and asbestos work, the unit is also responsible for the EPA's relatively new program of regulating underground storage tanks. These tanks usually store petroleum products such as oil, heating fuel, or gasoline. Many of the older tanks have begun to corrode and their leaks can contaminate groundwater. While the newer tanks are now made of fiberglass or protected steel, there are still thousands of older tanks in the state that can cause contamination problems.

All commercial owners are required to have their tanks registered for possible inspection. "Right now, optimistically, I would say there is 40 to 50 percent compliance," Deshefy said, and he expects the rest will be found. "We also look for them on the PCB inspections, and other units tell us when they find them."

After inspection, tanks that are considered unsafe must be removed.

Dollars and Detective Work

There are basically two reasons for lack of compliance with environmental regulations: either the company doesn't know about the regulations, or it chooses not to know about them.

"Unfortunately, it often comes down to dollars versus protecting the environment," Deshefy said. But, he stressed, in the long run it's cheaper to prevent the problems from occurring than to clean up the contaminated sites afterward. "And, of course, protecting life has no price tag," he said.

While the bigger companies are generally aware of the regulations and have policies to deal with them, many smaller companies do not have the resources to maintain internal controls or a staff to deal specifically with the regulations. And, of course, some deliberately hide violations that would be expensive to fix.

"We often find violators through good detective work," Deshefy said. "The inspectors have to do the research and ask pertinent questions. That takes a great deal of skill."

"We hope," Gilbert said, "that our stringent enforcement program will give companies the incentive to prevent environmental problems, instead of simply to react to them after they occur."

This is the second of a series of articles on the management of hazardous materials in Connecticut.

A Naturalist Looks at an Old Field

by

Gale W. Carter

Illustrations by

Caryn Alleva

Old fields are filled with beauty, history, and surprises for those who study them closely.

I have a favorite old field that I have enjoyed observing and studying for a long time. Over the years there have been many changes. There was a time when it was plowed up and used for a rutabaga patch. Later, in 1947, when I first began my observations, the field was all in grass. Henslow and grasshopper sparrows found this an attractive habitat. By 1963, when I next saw this field, there were enough environmental changes to cause the disappearance of those two species of sparrow from this field. It was still in grass, but a few pioneer plants, such as gray birch and eastern red cedar, had started to creep in. With the passage of the years, a large portion of the field became a virtual jungle. Plants like the northern arrowwood were dominating the field. The result was a reduction in the number of plant and animal species.

Managing the Old Field

In 1980, a new management policy was put into effect, and drastic surgery was applied to the shrubbery. Much of it was cut, but islands of green were left to supply food, cover, and nesting areas for a number of species of birds.

Each fall, the lower vegetation surrounding these islands of trees and shrubs is mowed. This prevents the return of the jungle-like condition. Paths leading in several directions in the field are mowed in the summer to make walking easier.

Adjoining the field is a wooded

area. Naturalists and ecologists refer to such a strip of land, where two environments join, as an "ecotone." Animals often are more plentiful here than in either the field or the woods. They have the best of two worlds and so their abundance produces what is known as the edge effect. Here grape, blackberry, and raspberry flourish. These are all favorites of animals, particularly many species of birds.



A Few of the Goldenrods

I would like to take a walk with you to see what we can find in this field. Let's begin our walk by smelling the leaf of lance-leaf goldenrod. It is one of the few species that is fragrant. Like the sweet goldenrod, its leaves can be used in making a tea. Goldenrod is a native American plant. Many of our wild flowers are aliens, introduced from foreign lands.

Many people think that goldenrod causes hay fever. It is the ragweed, with its light-weight pollen which is blown by the wind, that causes hay fever. The pollen of goldenrod is heavy and is carried by insects. A well-known botanist re-

marked that the only way to get hay fever from goldenrod would be if a bee loaded with pollen were to get up your nose.

Goldenrods often have a number of kinds of interesting galls. These are like plant tumors, the response of the plant to an irritation such as an insect which lays its egg on a plant stem. When I was about nine or 10, the boys in my neighborhood and I used to collect goldenrod stalks with the swollen goldenrod ball galls. We would strip the plant of all of its leaves and break off the plant above the gall. Then we bopped each other over the head with them. We referred to them as "noggin knockers."

Oldtimers used to refer to these galls as "rheumity buds." They believed that if they carried them around in their pockets while the developing insect inside was present, it would help their arthritis or rheumatism. It was only supposed to be effective if the insect was still inside the gall.

Along the Edge

Now let's walk along the edge to see what we can find. Draped over a privet bush are numerous fox grape vines. This grapevine can be recognized by its tendrils (modified leaves) or fruit clusters, which usually appear opposite each leaf. Other common species of grape have a missing tendril opposite every third leaf.

If we feel a branch of a nearby winged Euonymus, we will discover that it has corked ridges. This shrub is often confused with the burning bush because it has brilliant red leaves. However, the burning bush has conspicuous magenta

flowers, whereas the winged Euonymus has only tiny, whitish-green flowers that occur in the axil of the leaves early in the spring. There has been speculation that the corky ridges of the winged Euonymus may discourage browsing animals, such as deer.

There are several species of dogwood along this path. One is the familiar flowering dogwood, with its conspicuous white bracts that look like petals. The shrubby dogwoods have much smaller flower clusters and lack the bracts of flowering dogwood.

A clearing at one point along the trail offers a chance to see what changes are occurring along the edge of the field. Poison ivy, growing luxuriantly up a tree, is competing with oriental bittersweet for a place in the sun. Nearby, multiflora rose, Japanese honeysuckle, and Virginia creeper are draped over the shrubby vegetation. All of this growth appears jungle-like, and the trees appear gaunt under the relentless attack of these vines. The vines are not parasitic, but because of their attachment to the trees and shrubs, they block light that these plants usually receive.

Within the Field

In the field itself, a number of plants are left uncut to furnish food and cover for birds. These include gray birch, crab apple, northern arrowwood (a viburnum), and northern bayberry. Bayberry appears in old fields, growing up around trees and shrubbery, but it seems to do best at the seashore. It is a favorite of the yellow rumped warbler (myrtle), and tree swallows feed on the berries during their migration. These waxy berries have also been used for making bayberry candles.

The most spectacular plant growing in the field is the prairie blazing star, differentiated from other blazing stars by its recurved bracts

which support the flower head. It is a species growing out of its natural habitat, probably having escaped from someone's garden, because it can be purchased at some nurseries in the state. Prairie blazing star is a composite, having many tube or disk flowers and lacking the ray flowers common in many composites. It is mauve in color, wand-like, and has grass-like leaves. Its flower appears about the first of August and continues for a number of weeks. When the flowers are completely out, the stalk bends over, heavy with the weight of the flower.

A Contrasting Section

A section of the field is consider-



Flowering Dogwood

ably wetter than it is elsewhere. Here grow swamp dogwood, cut-leaved water horehound, arrow-leaved tear thumb, and purple loosestrife, along with sedges and rushes and many other species. This offers a chance to see the contrast between wet and drier areas.

Patches of narrow-leaved mountain mint are good places to see some of the common insects of the field that play roles as pollinators. For the most part, only four insect groups are represented: the bees and wasps, flies, butterflies and moths, and — a poor fourth — the beetles. All of the rest of the insect groups collectively are responsible for only two percent of the pollination. The

narrow-leaved mountain mint has all of the characteristics we usually associate with mints: a square stem, opposite leaf arrangement, and an irregular flower. It is also somewhat aromatic, but does not have the odor of a typical mint.

Joe Pye weed also attracts many insects. One sunny day, I observed 10 tiger swallow tail butterflies, all feeding at the same time at a large stand of these beautiful mauve flowers.

There are a couple of attractive spireas that blossom about the first of August. These are steeplebush and meadow sweet. The flower clusters in steeplebush are much tighter than those of meadow sweet, and they are more pointed and a darker pink.

One of my favorite flowers in the field is yarrow. I like its rich herby smell and the many interesting stories that go along with it. It has been considered a significant herb in medicine, with a recorded history going back at least 3000 years. I recall my mother using the dried leaves to make a tea that worked wonders in breaking up a fever.

Even in disturbed areas nearest the road, there are flowers that are worthy of mention. They include butter and eggs, deptford pink, cinquefoil, bittersweet nightshade, and pokeweed.

The fall is a choice time to visit this field. Great areas are blanketed with various species of goldenrod and the occasional aster. The crowning jewel, however, is the fringed gentian which oftentimes lies practically hidden in the tall grass.

The Endless Delight of Botany

The study of an old field, using no more equipment than a hand lens, can be a source of endless delight to those who enjoy the beauty of our natural world. There are wonders and interrelationships at every hand. I hope you will visit an old field and take a closer look.

The Night Sky

Straight from the Fish's Mouth

by
Francine Jackson

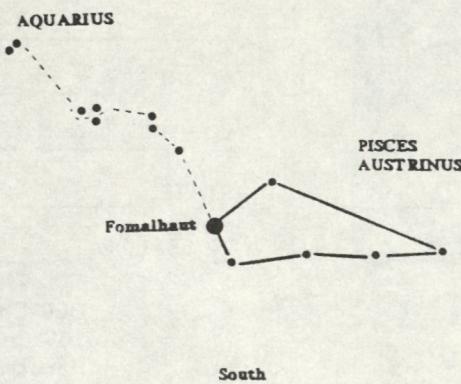
When I was a kid, my folks often took me to the airport to see the planes "go up and down." More fascinating to me, though, was to watch the planes' lights in the sky, sometimes moving overhead, often crossing my line of vision. Occasionally, there would be the lights that would approach me radially, showing no motion until the craft was almost on top of me. And, finally, there would be the light that never moved, the plane that never approached, because the light was from an object moving trillions of miles away. This, I was to learn, was a star.

In the fall, probably the star

most easily mistaken for a flying object is the one that sits just a few degrees above the southern horizon. It is one of the 20 brightest stars in our night sky, but is often overlooked because at most it is visible for only several hours in mid-fall skies. Its name is Fomalhaut — pronounced any way you care to, although the two most accepted are fo-mal-HOOT and FO-mal-oh — and is the brightest star in the con-

stellation *Pisces Austrinus*, the Southern Fish. Indeed, for most of us, it's the only star visible in *Pisces Austrinus*. Fomalhaut, according to legend, is the Fish's mouth. Directly above the Southern Fish is one of the zodiacal constellations, Aquarius, the Water Bearer. He is holding his water jug in such a position that water is running out of it straight into the fish's mouth. Those of you who live where the night sky is rather dark may see a faint line of stars leading from the center of Aquarius directly to Fomalhaut.

If you're still not sure you're looking at the right thing, there is another way to find Fomalhaut. Find the line from the Big Dipper to the North Star, and continue that line clear across the sky. If the light you find that way stays put for more than a few minutes, you have indeed found the mouth of the Southern Fish. ■



Letters to the Editor

I have enjoyed the *Bulletin* very much. It has informed me of the beauty in Connecticut and made me more aware of nature's secrets.

Thomas C. Smith
Middletown

Congratulations. The best thing to come out of Connecticut in my 80 years. Don't change anything. The artwork is especially to be praised.

Frederick Freeman
Essex

Thanks. Mike Klein has been doing our covers. We think he does good work too. Ed.

The Citizens' Bulletin keeps me wishing I still lived in Connecticut. You do a great job of education. Arizona needs you.

John F. Conklin
Sun City, Arizona



Readers are invited to share their views on environmental matters with us. Letters should be no more than 250 words, and should be accompanied by name, address, and phone number. Letters may be subject to editing. Let us know what you think about things.

Endnote

People are few,
Leaves also fall
Now and then.

Issa



It's not too early
to think about what
you'll put under the
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